

CLAIMS

1. Telecommunication fiber optic cable (11, 21, 31, 41) for gas pipeline application and having a built-in leakage detecting device (15, 18; 25, 28; 35, 38; 45, 48), the cable (11, 21, 31, 41) comprising:
 - 5 - an optical core (16, 26, 36, 46) including a number of telecommunication optical fibers (12, 22, 32, 42),
 - an outer jacket (13, 23, 33, 43) covering the optical core (16, 26, 36, 46), and
 - one or more gas leakage detector optical fibers (15, 25, 35, 45),

10 characterized in that said one or more gas leakage detector optical fibers (15, 25, 35, 45) are enclosed within the outer jacket (13, 23, 33, 43).

- 2. Optical cable according to claim 1, wherein said cable has a neutral axis and a preferential bending plane (PPB) and the leakage detector optical fibers (15, 25, 35, 45) are located at, or close to, a plane (OP) that is substantially orthogonal to the preferential bending plane (PPB) and passes through the neutral axis.
- 15 3. Optical cable according to claim 2, wherein it further comprises a linearly extending rod reinforcing system comprising strength rods (14, 24, 34, 44) that force the cable to bend in the preferential bending plane (PPB).
- 20 4. Optical cable according to claim 1, wherein the leakage detector optical fibers (15, 25, 35, 45) are helically wound by a unidirectional winding.
- 25 5. Optical cable according to claim 1, wherein the leakage detector optical fibers (15, 25, 35, 45) are helically wound by a SZ winding.
- 6. Optical cable according to any of the preceding claims, wherein said one or more gas leakage detector optical fibers (15, 25, 35, 45) comprise a tight protection structure composed by two concentric

layers, made of a silicone-based rubber and a polyamide compound, respectively.

7. Optical cable according to claim 6, wherein said one or more gas leakage detector optical fibers (15, 25, 35, 45) comprise a primer for providing adherence with the jacket (13, 23, 33, 43).
- 5 8. Optical cable according to any of claims 1-5, wherein the one or more gas leakage detector optical fibers (15, 25, 35, 45) are contained in one or more tubes (18, 28, 38, 48).
9. Optical cable according to claim 8, wherein the tubes comprise a primer for providing adherence with the jacket (13, 23, 33, 43).
- 10 10. Optical cable according to claim 8 or 9, wherein the tubes (18, 28, 38, 48) contain jelly.
11. Optical cable according to any of claims 3, wherein the strength rods (14, 24, 34, 44) comprise a primer for providing adherence with the 15 jacket (13, 23, 33, 43).
12. Optical cable according to any of claims 1-11, further comprising a metal barrier for gas-tightly closing the optical core.
13. Optical cable according to claim 12, wherein the metal barrier is selected from the group consisting of: thermally sealed Aluminium 20 Poly Laminated; corrugated extruded aluminium tube; non corrugated extruded aluminium tube; corrugated thermally sealed Steel Poly Laminated; non corrugated thermally sealed Steel Poly Laminated; corrugated longitudinal welded steel tube; and non corrugated longitudinal welded steel tube.
- 25 14. Optical cable according to claim 12 or 13, wherein the metal barrier comprises a primer for providing adherence with the jacket (13, 23, 33, 43).
15. Optical cable according to any of claim 7, 9, 11 and 14, wherein the

primer comprises a material selected from the group consisting of: Ethylene Acrylic Acid and their esters, Ethylene Metacrylic Acid and their esters, Ethylene Maleic Anhydride and their esters, or a mixture thereof.

- 5 16. Optical cable according to any of preceeding claims, wherein the optical core comprises a plurality of tubular elements arranged around a central strength member and loosely housing the telecommunication optical fibers.
- 10 17. Optical cable according to any of claims 1-15, wherein the optical core comprises a cylindrical member provided with grooves, each groove housing a number of telecommunication optical fibers.
- 18. Optical cable according to any of claims 1-15, wherein the optical core comprises a central tube housing the telecommunication optical fibers, the central tube comprising PBT or HDPE.
- 15 19. Optical cable according to any of claims 1-15, wherein the optical core comprises a metal central tube (47) housing the telecommunication optical fibers.
- 20 20. Optical cable according to claim 19, wherein it further comprises a non-metallic central tube (49), preferably made of plastic or the like, inserted within the metal central tube (47).
21. Optical cable according to any of the preceding claims, wherein the outer jacket has a thickness of at least about 2,0 mm, preferably about 2,6 mm.
- 25 22. Optical cable according to any of the preceding claims, wherein the reinforcing rods (14, 24, 34, 44) have a diameter of at least about 1,00 - 1,60 mm, preferably about 1,50 – 1,60 mm.